

## **REMARKS / ARGUMENTS**

### **Rejection under 35 USC §102**

Claims 1-20 stand rejected under 35 USC §102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0032954 to Bonfrate ("Bonfrate").

"Anticipated" means that all of the elements and limitations of a given claim are described in a single prior art reference. See e.g., *Akzo N.V. v. U.S. Int'l Trade Comm'n*, 808 F.2d 1471, 1479 (Fed.Cir.1986) ("Under 35 U.S.C. § 102, anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference").

Further, each claim must be ***read as a whole***. It is improper to use the claim language as a template to piece together select teachings of the prior art to re-create the claimed invention. *In re Fritch*, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1982).

### ***Examiner's Response to Arguments in Applicants' First Reply***

In page 8 of the Office Action in section 25 under the heading "Response to Arguments," the Examiner traverses Applicants' arguments set forth in Applicants' first Reply because "the claims as rejected do not explicitly disclose whether the steps involved are active or passive, and there is no clear argument as to why employing [an] active phase modulator would be patentable over the prior art."

These two points are addressed below.

#### ***I. "Active" nature of the steps is explicitly disclosed***

Independent claims 1, 3, 6 and 11 have been amended to directly state that the QKD system is ***actively*** stabilized. Likewise, dependent claims 7 and 12 have been amended to further clarify that the claimed methods include ***actively*** adjusting the phase.

Applicants respectfully submit that the ***active*** nature of the claimed invention is understood by one skilled in the art as being ***explicitly*** disclosed when reading the

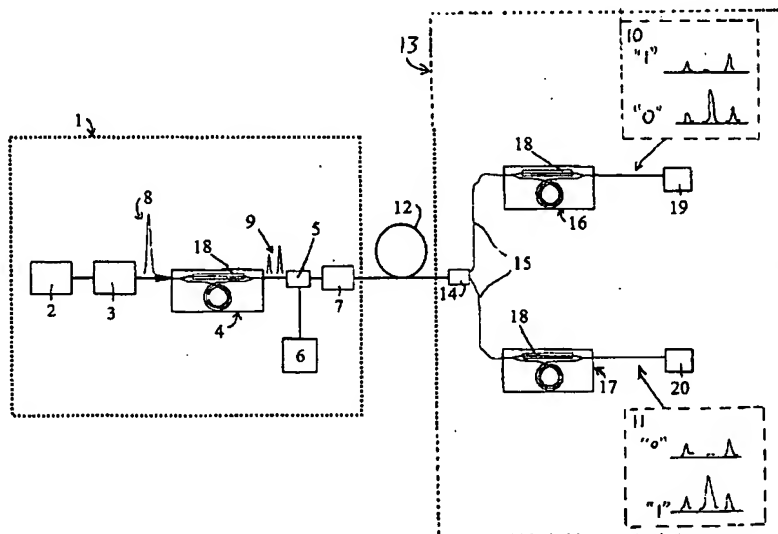
claims **as a whole**. That is to say, one needs to read the claims **in their entirety** to understand that all of the claim limitations collectively add up to forming an actively stabilized system or a method of active stabilization.

The claimed features that result in the actively stabilized systems and methods are nowhere to be found in Bonfrate.

## ***II. Arguments regarding the patentability of active phase modulation***

The Examiner notes that Applicants have provided no clear argument as to why employing an active phase modulator would be patentable over the cited prior art. Applicants' respectfully submit that their entire patent application and their claim limitations when compared with the cited prior art makes this case very effectively.

Applicants point out that the QKD system of Bonfrate is not actively or passively compensated and does not include a phase modulator at its receiver (13). Rather, receiver (13) has a configuration, as shown in FIG. 1 reproduced below, that obviates the need for a phase modulator. Specifically, the polarization beam splitter (PBS) (14) effectively acts as a random router of photon signals to the two single-photon detectors (19) and (20).



However, the two arms in receiver (13) **are not actively or passively phase-stabilized**, so that operational problems occur, as pointed out in Applicants' Published Application in paragraph [008]:

[0008] There are two main problems with a one-way interferometer used for QKD. One of them involves time variance of the quantum signal polarization. One needs to know the polarization state of the quantum signal precisely as it arrives at Bob. Otherwise, it is very difficult to modulate the signal and keep the interferometer balanced. Another problem involves temperature drift in the interferometer, which causes a phase shift that destroys the intended interference.

Applicants' actively adjusting the phase in an interferometer loop at Bob (i.e., in the optical path at "Bob") using, for example, a phase shifter and a control signal as claimed in claim 1, provides active compensation of the QKD system to mitigate the above-identified problems with uncompensated QKD systems such as that of Bonfrate. While Applicants' invention is admittedly more complex than prior art QKD systems (including Bonfrate), it represents a substantial improvement over such uncompensated QKD systems.

Applicants' also hasten to add that its claims are patentable over the cited art under 35 USC §102(e) because **the cited art does not disclose each and every claim limitation of Applicants' invention**. This is the legal standard that must be applied in assessing whether the claimed invention is patentable over the cited art. The Examiner has the burden of finding each and every claim limitation in the cited reference in order to sustain an anticipation rejection under 35 USC §102(e), and it is manifestly clear that the teachings of Bonfrate cannot be used to meet this burden.

For at least the above reasons, Applicants respectfully submit that its pending claims are patentable over Bonfrate and traverse the anticipation rejection, and respectfully request withdrawal of same.

### CONCLUSION

Applicants respectfully submit that all of the pending claims 1-20 as presently presented are in condition for allowance. Applicants therefore respectfully request withdrawal of the anticipation rejection and the issuance of a Notice of Allowance for all of the presently pending claims.

The Examiner is encouraged to contact the Assignee's authorized representative at 941-378-2744 to discuss any questions that may arise in connection with this Reply.

Respectfully Submitted,

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